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***Note: I wrote up these questions using our lecture slides from last year. While they are very similar—and often identical—to the ones used this year, some may vary slightly, so a couple of the questions on here might not have been covered in your lectures. If you find any errors, please let me know. Note also that the VAST majority of the questions from Dr. Dignam and Dr. Smith on this exam will be clinical vignettes. Unfortunately, this is not reflected in this practice test because I have not yet become proficient at writing clinical vignettes…but you should still keep this in mind.***

1. What is the leading cause of permanent premature disability in the United States labor force?
2. Diabetes
3. Coronary Heart Disease
4. Stroke
5. Mental Illness
6. None of these
7. Consider two patients, A and B. Patient A is 37 years old and in good health. Patient B is 32 years old and obese. How much greater is the life expectancy for patient A compared to patient B?
8. 3 years
9. 6 years
10. 9 years
11. 12 years
12. 15 years
13. Which of these would you not expect to see in an individual with a BMI of 42, as compared to an individual with a BMI of 24?
14. High GnT-4a activity
15. High TNFα levels
16. High IL-6 levels
17. Increased activation of AKT-1
18. None of these
19. The rate of which type of cancer is 10x higher in industrialized areas?
20. Stomach cancer
21. Oral cancer
22. Liver cancer
23. Colorectal cancer
24. Pancreatic cancer
25. Which of the following is a factor that increases salt sensitivity?
26. Old age
27. Male
28. Caucasian
29. Two of the above
30. All of the above
31. For men ages 25-65, the recommended daily intakes of calcium and Vitamin D, respectively, are:
32. 1000 mg and 400-800 IU
33. 1500 mg and 400-800 IU
34. 1000 mg and 800-1000 IU
35. 1500 mg and 800-1000 IU
36. 1000 mg and 1000-1500 IU
37. You have an obese patient with a co-morbidity and a BMI of 37. Which of these treatment options are viable for the patient to treat their obesity?
38. Diet and exercise
39. Pharmacotherapy
40. Surgery
41. A and B
42. A, B, and C
43. Which of these accurately describes the levels of urinary ammonia in a patient with progressive starvation-induced Protein-Energy Malnutrition (PEM)?
44. Levels consistently remain high.
45. Levels consistently remain low.
46. Levels initially rise, and then gradually drop.
47. Levels initially drop, and then gradually rise.
48. Levels oscillate between high and low (i.e. constant cycles of rising and falling).
49. Which of these would you not expect to see in a patient with Acute Catabolic Insult-Induced PEM?
50. Decreased insulin sensitivity
51. Increased glucagon
52. Increased cortisol
53. Hypometabolism
54. All of these would be expected with this patient.
55. What is the approximate protein content of a food item that contains 3.4 grams of nitrogen?
56. 15.6 g
57. 21.3 g
58. 35.8 g
59. 42.4 g
60. 56 g
61. You are treating a patient with PEM who has lost 10 kg. Approximately how much protein would it be appropriate to give this patient as treatment?
62. 15 g
63. 25 g
64. 35 g
65. 45 g
66. 55 g
67. A patient comes to you with nystagmus and photosensitivity. After conducting a thorough patient history and running all the necessary tests, you diagnose the patient with Hartnup’s disease, and explain that it is caused by a genetic defect in the uptake of which amino acid?
68. Tryptophan
69. Niacin
70. Tyrosine
71. Phenylalanine
72. Serine
73. Dermatitis, dementia, diarrhea, and death, collectively known as the “4 D’s,” are symptomatic of a deficiency in which vitamin?
74. A
75. B
76. C
77. D
78. E
79. Choose the correct statement.
80. Broccoli is a better source of vitamin B12 than are eggs.
81. A deficiency in cyanocobalmin is more likely to be seen in a vegan than in someone with a diet consisting of meats and fish.
82. 4 grams per day of Vitamin C is considered an appropriate amount.
83. α-tocopherol is the most abundant and active form of Vitamin K.
84. Coumadin, also known as Warfarin, is an antagonist of Vitamin E that is often used clinically to inhibit blood coagulation.
85. Which of the following is not a risk factor for Metabolic Syndrome?
86. A triglyceride level of 164 mg/dL
87. A fasting glucose level of 125 mg/dL
88. A blood pressure of 135/90
89. An abdominal girth of 30 inches
90. An HDL cholesterol level of 35 g/dL
91. Which statement is true?
92. Metformin is a Biguanide that activates AMP-activated protein kinase to down-regulate insulin targets.
93. Repaglinide is a Sulfonylurea agent that inhibits the ATP-dependent potassium channel.
94. Meglitinides are the most widely used anti-diabetic drugs.
95. Pioglitazone is a Thiazolidinedione (TZD) that decreases peripheral insulin sensitivity.
96. Both Repaglinide and Glyburide increase insulin secretion from pancreatic beta cells.
97. Compared to a patient with normal weight, an obese patient would be expected to have \_\_\_\_\_\_ levels of Adiponectin and \_\_\_\_\_\_ levels of TNFα.
98. Higher; Higher
99. Lower; Lower
100. Higher; Lower
101. Lower; Higher
102. Equal; Higher
103. Which statement is false about the Ca2+/Phosphoinositide signal pathway?
104. Diacylglycerol and Inositol Triphosphate are both produced via the cleavage of PIP2 by Protein Kinase C.
105. IP3 triggers Calcium release from intracellular stores, which leads to the Ca2+/Calmodulin cascade.
106. Phospholipase C is activated by a protein called Gq
107. Drugs such as calcium ionophores mimic the actions of IP3.
108. None of the above.
109. Compared to peptides and proteins, catecholamines have

I.The same mechanism of secretion. II. A longer half-life in blood. III. Stronger binding to plasma proteins. IV. A longer time course of action.

1. I only
2. I, II, and IV only
3. II and III only
4. III and IV only
5. I, II, III, and IV
6. The role of Thrombin in extrinsic coagulation is to accelerate the activation of which clotting factors? Choose all correct answers!
7. Factor V
8. Factor VII
9. Factor VIII
10. Factor IX
11. Factor X
12. Factor XI
13. Factor XIII
14. Activated protein C (APC) proteolytically inactivates which of the following clotting factors?
15. Factor V and VIIa
16. Factors V and VIIIa
17. Factors VIIa and VIIIa
18. Factors V and IX
19. Factors VIIa and IX
20. Which of the following occurs in the intrinsic coagulation pathway? Note that 🡪 means “activates.”
21. Factor Xa+Thrombin🡪Factor XII
22. Factor VIII🡪Factor Xa
23. Factor XII+HMWK🡪Factor IX🡪Factor XI
24. Factor XII+HMWK🡪Factor XI🡪Factor IX
25. Factor VIII+Thrombin🡪Factor Xa
26. For the amino acids Isoleucine, Tyrosine, and Phenylalanine, identify each as essential, conditionally essential, or nonessential.
27. Isoleucine-essential, Tyrosine-essential, Phenylalanine-conditionally essential
28. Isoleucine-nonessential, Tyrosine-conditionally essential, Phenylalanine-essential
29. Isoleucine-essential, Tyrosine-nonessential, Phenylalanine-conditionally essential
30. Isoleucine-nonessential, Tyrosine-conditionally essential, Phenylalanine-essential
31. Isoleucine-essential, Tyrosine-nonessential, Phenylalanine-nonessential
32. Which statement is true about the Urea Cycle?
33. The first three reactions occur in the mitochondria, while the last two occur in the cytosol.
34. Ammonia is used in both the first and second steps of the cycle.
35. The enzyme that catalyzes the final step of the cycle is absent in the kidney.
36. In one of the steps of the cycle, argininosuccinate and fumarate are formed from arginine.
37. Ornithine is produced in the mitochondria and then transported to the cytosol where the remaining reactions of the cycle occur.
38. Which of these glucogenic amino acids is metabolized to fumarate?
39. Valine
40. Tryptophan
41. Methionine
42. Tyrosine
43. Lysine
44. A patient presents to you with joint inflammation and reddish tints in his skin. In addition, when his urine is exposed to oxygen, it turns black. The disorder that the patient most likely has results from insufficient production of:
45. Maleylacetoacetid acid
46. Homogentisate
47. p-Hydroxyphenylpyruvate
48. Homocysteine
49. S-adenosylmethionine
50. Which of the following diseases results from a defective Na+ dependent anionic amino acid transporter?
51. Imino glycinuria
52. Cystinuria
53. Hartnup disorder
54. Dicarboxylic aminoaciduria
55. Alkaptonuria
56. Which of these is a viable treatment for a patient with Cystinuria?
57. Increasing protein in the diet
58. Treatment with cystine
59. Decreased water intake
60. Decreased dietary methionine
61. Decreased dietary Isoleucine
62. Which of the following symptoms would you expect to see in a breast-fed infant with Lysinuric Protein Intolerance?
63. An enlarged spleen
64. Diarrhea
65. Episodic hyperammonemia
66. Muscular hypotonia
67. None of the above
68. Ketamine can be used as a treatment for which of the following disorders?
69. Cystinuria
70. Nonketotic Hyperglycinemia
71. Alkaptonuria
72. Maple Syrup Disease
73. Methylmalonic Acidemia
74. Neither the muscle nor the brain can synthesize glucose from lactate, because neither has the enzyme
75. Glucose-6-phosphatase
76. Glucose-3-phosphatase
77. Acetyl-CoA Carboxylase
78. Propionyl-CoA Carboxylase
79. Pyruvate Carboxylase
80. Consider the process of glycogen metabolism. Which glycosidic bond is hydrolyzed by the transferase enzyme?
81. α (1🡪4)
82. α (1🡪6)
83. β (1🡪4)
84. β (1🡪6)
85. None of these
86. Compared to a patient with untreated diabetes, a healthy patient would have increased:
87. Fatty acid oxidation
88. Mitochondrial uptake of fatty acids
89. Malonyl-CoA production
90. Acetyl-CoA diverted to Acetoacetate
91. None of the above
92. What enzyme catalyzes the conversion of diacylglycerol to triacylglycerol in triacylglycerol biosynthesis?
93. Phosphatidate Phosphatase
94. Diglyceride Acyltransferase
95. Glycerol-3-Phosphate Acyltransferase
96. 1-Acyl-Glycerol-3-Phosphate Acyltransferase
97. Thiolase
98. Which class of Eicosanoids plays a role in decreasing platelet aggregation?
99. Thromboxanes
100. Leukotrienes
101. Prostacyclins
102. Both B and C
103. All of the above
104. Which of these is the correct sequence of intermediates in the cholesterol synthesis pathway in mammalian cells?
105. Isopentyl-PP, Farnesyl-PP, Geranyl-PP, Squalene, Cholesterol
106. Mevalonate, Isopentyl-PP, Squalene, Farnesyl-PP, Cholesterol
107. Geranyl-PP, Farnesyl-PP, Isopentyl-PP, Squalene, Cholesterol
108. Mevalonate, Isopentyl-PP, Farnesyl-PP, Geranyl-PP, Squalene
109. Isopentyl-PP, Geranyl-PP, Farnesyl-PP, Squalene, Cholesterol
110. Which statement is true?
111. Most fat absorption occurs in the lower third of the small intestine.
112. Orlistat is a drug which inhibits the enzyme that catalyzes to conversion of 1-monoacylglycerol to fatty acid and glycerol.
113. Chylomicrons enter the venous system through the right subclavian vein.
114. A and B are true.
115. B and C are true.
116. Which statement is false?
117. LDLs contain more proteins than lipids.
118. HDLs contain more phospholipids than triacylglycerol.
119. VLDLs contain more free cholesterol than chylomicrons.
120. Apolipoprotein A-II is found in HDLs and chylomicrons, but not in LDLs or VLDLs.
121. Apolipoprotein B-48 is found in chylomicrons, but not in HDLs or LDLs.
122. Triacylglycerol is the major core lipid of which apolipoprotein(s)?
123. HDLs and Chylomicrons
124. VLDLs and HDLs
125. HDLs and LDLs
126. VLDLs and LDLs
127. VLDLs and Chylomicrons
128. Insulin \_\_\_\_\_ fatty acid release from human adipocytes by \_\_\_\_\_\_ glycolysis and \_\_\_\_\_\_ hormone-sensitive lipase.
129. Stimulates; Increasing; Inhibiting
130. Inhibits; Decreasing; Stimulating
131. Inhibits; Increasing; Inhibiting
132. Stimulates; Decreasing; Stimulating
133. Inhibits; Increasing; Stimulating
134. Which statement is true?
135. Ezetimibe is a drug that increases cholesterol transport into intestinal cells.
136. Soluble fibers decrease the conversion of cholesterol to bile acids.
137. Phytosterols increase cholesterol incorporation into micelles
138. Statins inhibit 7-α-hydroxylase.
139. None of these.
140. Lipoprotein a is
141. Present in HDLs
142. Synthesized in the small intestine
143. Covalently linked to apo B-100 in LDLs
144. Expected to be present in lower amounts in a patient at risk for CVD (as opposed to one who is not at risk)
145. None of these
146. Which of these is defined as “localized necrosis due to loss of blood supply?”
147. Infarction
148. Ischemia
149. Arteriosclerosis
150. Atherosclerosis
151. Angina
152. Increased hepatic triglyceride syntheses will increase the number of….
153. Small, dense HDL but not LDL
154. Small, dense LDL, but not HDL
155. Both small, dense LDL and small, dense HDL
156. Neither small dense LDL, nor small, dense HDL
157. None of the above
158. What would be the triacylglycerol level of a patient with LDL of 150, and HDL of 50, and a total cholesterol level of 250?
159. 180
160. 120
161. 50
162. 250
163. 100
164. Choose the incorrect statement about fibrates.
165. Fibrates increase HDL cholesterol.
166. Fibrates have very little of no effect on LDL cholesterol.
167. Fibrates have very little or no effect on triacylglycerol.
168. Fibrates may increase morbidity.
169. Fibrates are agonists for a transcription factor involved in lipid metabolism.
170. Which of these is a phenotype for Familial Defective Apo B-100?
171. LDL-C levels increased 1.5 to 2-fold.
172. LDL-C levels increased 4-fold.
173. LDL-C levels greater than 190 mg/dl.
174. CHD 3x to 4x general population.
175. Widespread severe atherosclerosis.
176. Choose the incorrect statement about glutathione.
177. The enzyme glutamyl cysteine synthetase is involved in its synthesis.
178. It is involved in the reduction of oxidized protein thiols.
179. It is involved in the detoxification of hydrogen peroxide.
180. It is made directly from γ-glutamyl cysteine and glycine.
181. It is responsible for the oxidation of Hb (Fe2+) to MetHb (Fe2+).
182. Which of these pathological states will result in an increase of 2,3-BPG?
183. Cystic fibrosis
184. Hyperthyroidism
185. Anemia
186. Obstructive pulmonary disease
187. None of these.
188. Which statement is false about the anion exchange protein I-Band 3?
189. It is electroneutral
190. It is a dimer
191. It contains 12 membrane spanning helices
192. It associates with G-6-P dehydrogenase
193. It exchanges Cl- for HCO3-
194. An individual with a terminal fucose and N-acetylgalactosamine side-chain will have which blood type?
195. A
196. B
197. AB
198. O
199. None of the above.
200. Which statement is false about iron uptake?
201. The enzyme ferric reductase is located on the apical surface of the enterocyte.
202. The Divalent metal transporter 1 (DMT1) is the proton-coupled transporter of Fe3+
203. Hepcidin inhibits iron absorption
204. Ceruloplasmin is involved in the delivery of iron to various tissues
205. Hephaestin is an integral membrane protein on the basolateral surface
206. Which of these dietary factors promotes iron uptake?
207. Phytate
208. Histidine
209. Oxalic acid
210. Non-cellulose fiber
211. Bicarbonate
212. Which of these is a laboratory indicator of stage 2 iron deficiency?
213. Decrease in hemoglobin
214. Increase in mean corpuscular volume
215. Decrease in mean corpuscular volume
216. Increase in small hypochromic erythrocytes
217. Decrease in serum ferritin
218. The rate controlling step in porphyrin biosynthesis
219. Is catalyzed by alanine synthase
220. Occurs in the cytosol
221. Requires pyridoxal phosphate
222. A and C only
223. A, B, and C
224. Uroporphyrinogen decarboxylase catalyzes the formation of
225. Uroporphyrinogen III
226. Coproporphyrinogen III
227. Uroporphyrinogen I
228. Protoporphyrinogen III
229. Protoporphyrin III
230. Choose the correct statement regarding the regulation of globin synthesis by heme.
231. Iron levels have no effect on the synthesis of globin
232. Increased ALAS2 activity inhibits heme synthesis
233. Decreased heme levels activate a protein kinase
234. When iron is low, IRE-BP stimulates the translation of ALAS2 mRNA
235. A-D are all false.
236. Which of the following proteins is synthesized in the liver?
237. Haptoglobin
238. Albumin
239. Hemopexin
240. All of the above
241. None of the above
242. Jaundice can result from all of the following except
243. Increased bilirubin production
244. Blockage of bile flow
245. Increased hepatic uptake of bilirubin
246. Decreased conjugation of bilirubin
247. Decreased transport of bilirubin conjugates into bile
248. Which enzyme catalyzes the rate-limiting step in bilirubin conjugation?
249. UDP-glucuronosyl transferase
250. UDP-Glucose dehydrogenase
251. Heme oxygenase
252. Heme transferase
253. Biliverdin reductase